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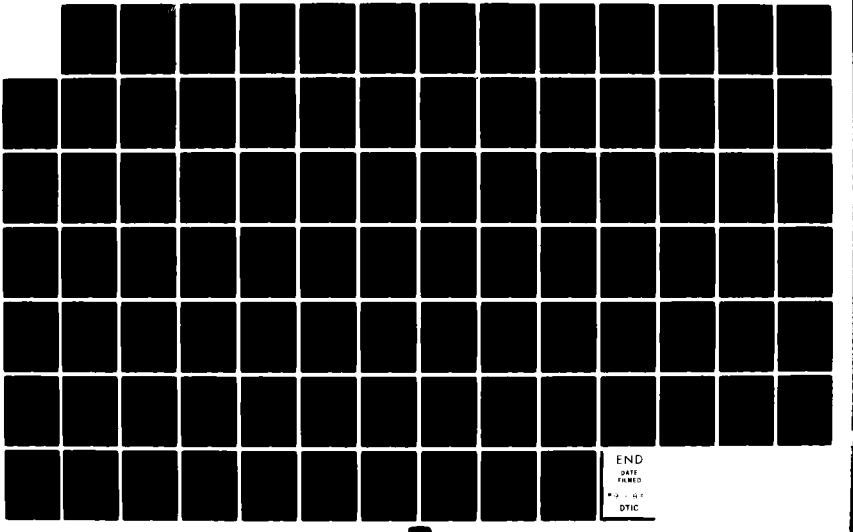

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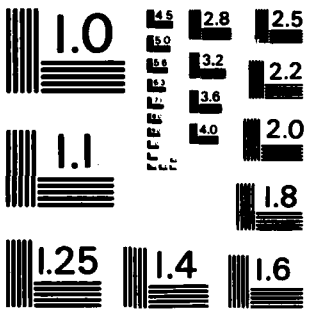

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THE USE OF LOW IONIC STRENGTH SOLUTIONS FOR A RAPID COMPATIBILITY (CROSSMATCH) TEST

Final Report

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Studies were performed to determine the feasibility of performing all aspects of pretransfusion testing utilizing low ionic strength solutions (LISS) and to determine the optimal means of preparing, packaging, storing and shipping materials necessary for the use of LISS solutions considering military needs. Emphasis in our previous study and in all published studies had been on the cross-match test since it was logical to first determine if the use of LISS offered significant advantages over current compatibility test

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procedures. ~~In this study,~~ We evaluated the use of LISS suspended red blood cells (RBC) for use in all aspects of pretransfusion testing: ABO antigen typing, Rh antigen typing, various additional red blood cell antigen typing, and antibody identification. We also compared various commercial preparations of LISS, bulk LISS preparations and pre-packaged chemicals in order to determine which would be most feasible for use in various military settings in terms of cost and ease of transport.

Using LISS suspended RBC there were no discrepancies found in over 200 ABO antigen typings when compared to RBC suspended in isotonic saline. These typings included ABO subgroups as well as cord red blood cells. Additionally, no discrepancies with saline suspended RBC were found when using LISS suspended RBC in 476 additional RBC antigen typings. These antigen typings included the following blood group systems: Rh-Hr, Kell, Kidd, Duffy, Lewis, P, MNSs, and Colton. Kidd antigen typing may be improved using LISS suspended RBC. LISS was shown to adequately identify 75 RBC antibodies of various specificities using RBC antibody identification panels and an incubation time of 10 minutes. Antibody specificities included those in the Rh-Hr, Kell, Kidd, and Duffy blood group systems. Sera containing antibodies having a single specificity (i.e., anti-D) as well as sera with multiple antibody specifiities (i.e., anti-D+Kell) were tested and identified. Our data indicates that LISS suspended RBC are adequate for use in all aspects of pretransfusion testing without need for the use of additional techniques.

However, other studies performed ~~in our~~ laboratory (not part of the present contract) demonstrate that the use of LISS will increase unnecessary antibody detection (i.e., clinically insignificant, complement binding antibodies) when using polyspecific antiglobulin reagent. In tests of 11,631 random sera, use of LISS caused the detection of 2.3% clinically insignificant RBC antibodies by virtue of the anticomplement component contained in antiglobulin reagent. Clinically significant antibodies detectable only with the anticomplement component of antiglobulin sera were found to be relatively uncommon (1 in 7007; 0.014%). Therefore, in order to avoid unnecessary antibody detection in military settings where extreme urgency is indicated, we recommend that monospecific anti-IgG antiglobulin sera be used with LISS suspended RBC for all aspects of pre-transfusion testing.

Commercial preparations of LISS were found too inconvenient and expensive for practical military use. For stable military situations a bulk LISS preparation (10 liters) is recommended with a shelf storage at room temperature of 1 year. For active military conditions (i.e. combat areas) a preweighed "LISS Emergency Packet" which is prepackaged for easy transport and storage is recommended. These packets are stable at room temperature and contain sufficient chemicals to provide 1000 ml of LISS when diluted with water.

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SUMMARY

Studies were performed to determine the feasibility of performing all aspects of pretransfusion testing utilizing low ionic strength solutions (LISS) and to determine the optimal means of preparing, packaging, storing and shipping materials necessary for the use of LISS solutions considering military needs. Emphasis in our previous study and in all published studies has been on the crossmatch test since it was logical to first determine if the use of LISS offered significant advantages over current compatibility test procedures. In this study, we evaluated the use of LISS suspended red blood cells (RBC) for use in all aspects of pretransfusion testing: ABO antigen typing, Rh antigen typing, various additional red blood cell antigen typing, and antibody identification. We also compared various commercial preparations of LISS, bulk LISS preparations and pre-packaged chemicals in order to determine which would be most feasible for use in various military settings in terms of cost and ease of transport.

Using LISS suspended RBC there were no discrepancies found in over 200 ABO antigen typings when compared to RBC suspended in isotonic saline. These typings included ABO subgroups as well as cord red blood cells. Additionally, no discrepancies with saline suspended RBC were found when using LISS suspended RBC in 476 additional RBC antigen typings. These antigen typings included the following blood group systems: Rh-Hr, Kell, Kidd, Duffy, Lewis, P, MNSs and Colton. Kidd antigen typing may be improved using LISS suspended RBC. LISS was shown to adequately identify 75 RBC antibodies of various specificities using RBC antibody identification panels and an incubation time of 10 minutes. Antibody specificities included those in the Rh-Hr, Kell, Kidd, and Duffy blood group systems. Sera containing antibodies having a single specificity (i.e., anti-D) as well as sera with multiple antibody specificities (i.e., anti-D+Kell) were tested and identified. Our data indicates that LISS suspended RBC are adequate for use in all aspects of pretransfusion testing without need for the use of additional techniques.

However, other studies performed in our laboratory (not part of the present contract) demonstrate that the use of LISS will increase unnecessary antibody detection (i.e., clinically insignificant, complement binding antibodies) when using polyspecific antiglobulin reagent. In tests of 11,631 random sera, use of LISS caused the detection of 2.3% clinically insignificant RBC antibodies by virtue of the anticomplement component contained in antiglobulin reagent. Clinically significant antibodies detectable only with the anticomplement component of antiglobulin sera were found to be relatively uncommon (1 in 7007; 0.014%). Therefore, in order to avoid unnecessary antibody detection in military settings where extreme urgency is indicated, we recommend that

monospecific anti-IgG antiglobulin sera be used with LISS suspended RBC for all aspects of pre-transfusion testing.

Commercial preparations of LISS were found too inconvenient and expensive for practical military use. For stable military situations a bulk LISS preparation (10 liters) is recommended with a shelf storage at room temperature of 1 year. For active military conditions (i.e. combat areas) a preweighed "LISS Emergency Packet" which is prepackaged for easy transport and storage is recommended. These packets are stable at room temperature and contain sufficient chemicals to provide 1000 ml of LISS when diluted with water.

BACKGROUND

It has been common practice for many years to carry out compatibility testing on red cells suspended in normal, isotonic (0.15M) saline (NaCl). The most commonly used procedures involve incubating donor red cells and recipient serum at room temperature and 37°C. Bovine albumin is often added and after the tubes are inspected for agglutination the red cells are washed and tested with anti-human globulin serum (indirect antiglobulin test). Incubation times are not standard, but usually times of 15-30 minutes as recommended by the AABB Technical Manual (1) are used.

It was reported that sensitization of red blood cells in bovine albumin medium, prior to the addition of the antiglobulin reagent, enhanced the strength of the reaction above that of the traditional method using saline (2-4). From these studies it was concluded that a 15 minute sensitization period of albumin-suspended red blood cells, with sera containing antibodies, is equal to a longer time of incubation in either medium when followed by the antiglobulin procedure.

In 1964, Hughes-Jones et al (5) and Elliot et al (6) showed that if the ionic strength of the red cell suspending medium was lowered the antiglobulin reaction was considerably enhanced. The speed of reaction can be increased 1000-fold by a reduction in the NaCl concentration from 0.17M to 0.03M (7). Although these reports suggested that the detection of most blood group antibodies was enhanced, and indeed, suggested that sensitivity equaled that of using enzyme premodified red blood cells, the principles have not been generally utilized in manual testing although they have been employed in automated antibody testing (8).

However, interest in this methodology was suddenly awakened in 1974 by the report of Löw and Messeter (9) who reported that the LISS method had been routinely used in the blood bank at University Hospital in Lund, Sweden, since 1967. They utilized a 5-minute incubation time and stated that nonspecific reactions were negligible when the salt concentration was at least 0.03M. At lower salt concentrations, both γ-globulin and complement components were demonstrable on the red cells (10,11). Although a "scarcity of technicians" did not permit parallel testing with isotonic media, the percentage of samples in which antibodies were detected increased, the reactions were more clear-cut and easier to interpret, and the number of unidentified antibodies remained about the same. Further, more than 100,000 units of blood cross-matched with this method were transfused without any transfusion reaction due to unidentified blood group antibodies.

Further reports followed at a rapidly increasing rate (12-18). Moore and Mollison's data (12) indicated that a 10-minute incubation time was wiser because there were several instances in which reactions were stronger at 10 minutes than at 5 minutes. Included

in their study were data concerning selected Rh antibodies which gave very weak or negative reactions in the saline indirect antiglobulin test but which strongly agglutinated enzyme-treated red cells. When these sera were tested against red cells in LISS, the indirect antiglobulin titer was sometimes almost as high as the titer with enzyme-treated cells. The authors also compared LISS with techniques using albumin-suspended red cells. They concluded that LISS was more sensitive than suspending red cells in albumin and that sensitivity was slightly greater than that achieved by prolonged incubation (90 minutes or more) with saline-suspended cells.

Wicker and Wallas (13) reported that all of more than 50 Rh antibodies and more than 75 non-Rh antibodies were detected in the antiglobulin test after incubation for 15 minutes in low-ionic strength medium, whereas 30 to 60 minutes were required to detect some of these antibodies using a conventional albumin-fortified isotonic medium.

Our previous studies as a result of work performed under this contract have been published in abstract form (19) and have been presented at the joint meeting of the International Society of Hematology and Blood Transfusion (20) and at the 31st Annual Meeting of the American Association of Blood Banks (21). In essence, we have determined the optimal ionic strength of LISS, the value of preservatives in order to produce a LISS stable for up to 6 months, optimal ratios of serum and red cells, optimal incubation times, sensitivity compared to other frequently utilized red cell suspending media (i.e. saline and albumin), and the frequency of non-specific reactions.

Our early results have been reported in depth (for details see Annual Report number DAMD 17-77-C-7013 submitted April 4, 1978. entitled, "Development of an Emergency Compatibility (Crossmatch) Test").

In general, there is agreement that the use of low ionic strength media allows for detection of red cell antibodies in the antiglobulin test after only 10 minutes of incubation, with a sensitivity somewhat but not strikingly greater than incubation in albumin media for 15 to 30 minutes. Also, somewhat stronger reactions than with albumin-suspended cells are obtained with a significant percentage of sera. Although "false positive" or nonspecific reactions and the detection of clinically insignificant cold antibodies occur somewhat more frequently with LISS than with saline or albumin techniques, they may not be a significant problem if the room temperature incubation phase of the crossmatch is omitted (22). Also, the reagent as described by Moore and Mollison (12) is easy and inexpensive to prepare, thus considerably decreasing the expense of reagents required for the performance of the antibody screen and crossmatch. Some large blood transfusion services make their own LISS to take advantage of this considerable

savings (22). Modifications of this reagent have been manufactured, but no published data indicate that they are significantly superior to the Lŏw and Messeter or Moore and Mollison reagent.

Because all previously published reports have been concerned only with the use of LISS suspended red blood cells for the detection of red cell antibodies for use in antibody detection and compatibility testing, the purpose of this study was to ascertain whether or not LISS suspended red blood cells can be used for all aspects of pretransfusion testing.

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READING (GRADING) OF AGGLUTINATION RESULTS FOR TOTAL STUDY

All tests were inspected macroscopically and all negative reactions were checked microscopically. The following gradings were used:

4+	No unagglutinated cells - background clear.*
3+	Several large agglutinates - few free cells - background clear.*
2+	Moderate size agglutinates - more free cells - background slightly cloudy.*
1+	Numerous small agglutinates - many free cells - background cloudy.*
½+	Scattered tiny agglutinates in a sea of unagglutinated cells - background cloudy.*
( )	Microscopically positive only - (½) is slightly weaker than (1).
0	No agglutination

* Visible macroscopically

½ = intermediate reaction - e.g., 2½+ is stronger than 2+ but weaker than 3+.

1. DETERMINATION OF THE FEASIBILITY OF PERFORMING ALL ASPECTS OF PRE-TRANSFUSION TESTING UTILIZING LOW IONIC STRENGTH SOLUTIONS

The adequacy of LISS suspended red blood cells (RBC) for use in RBC antigen typing was investigated. Antigen typing using LISS suspended RBC was compared to recommended procedures established by individual commercial manufacturers. In general, when using LISS suspended RBC for antigen typing with agglutinating antisera (i.e. ABO, Rh-Hr, Lewis, etc) the incubation times used were those recommended by the manufacturer. However, when using commercial typing sera reactive by the indirect antiglobulin technique, LISS suspended RBC were incubated for only 10 minutes compared to the 30 minute incubations generally recommended by the manufacturer when using saline suspended RBC.

In 200 ABO typings (Table 1) no discrepancies were observed between the use of saline suspended RBC and LISS suspended RBC. These typings included 90 Group O, 76 Group A, 22 Group B and 12 Group AB. Additionally, typings with 7 Group A_2B, 5 Group A_2, and 3 Group Ax RBC demonstrated that LISS suspended RBC are adequate for the proper determination of various ABO subgroups (Table 2). Finally, ABO typing of 4 cord blood samples gave similar results using saline suspended RBC as when using LISS suspended RBC (Table 3).

Rh antigen typing was also adequately performed using LISS suspended RBC when compared to conventional typing methods using saline suspended RBC. In fact, Rh antigen typing resulted in somewhat stronger reactions when using the LISS suspended RBC than when using saline suspended RBC. Table 4 contains comparative results on 75 Rh phenotypings, which includes most of the various possible Rh genotypes.

An additional 401 antigen typings were compared which included all the major blood group systems. (Table 5 thru 20). LISS suspended RBC antigen typings were similar to antigen typings using saline suspended RBC with no discrepancies found. However, when using indirect antiglobulin test reactive antisera, accurate antigen typings were possible when using LISS suspended RBC at a reduced incubation time of 10 minutes compared to 30 minutes when using saline suspended RBC. This additional time savings can be of extreme importance in certain military settings. Additionally, both Jk^a and Jk^b often reacted more strongly when using the LISS suspended RBC when compared with conventional typing using saline suspended RBC (Table 11 and 12).

In order to determine the optimal conditions for using LISS in the investigation of clinically significant antibodies, it was necessary to determine the incidence of clinically insignificant antibodies detectable when using a LISS system.

In this report we have classified clinically significant antibodies to be those of the Rh-Hr, Kell, Duffy, Kidd, and Ss system. We have classified clinically insignificant antibodies to be those

of the P, Lewis, MN, Ii and antibodies of no definable specificity.

One important variable is whether or not a polyspecific antiglobulin reagent or a monospecific anti-IgG reagent should be employed. In a separate study that was not part of this contract, we determined the incidence of clinically insignificant and clinically significant antibodies which are only reactive with the anticomplement component of antiglobulin sera. We studied 11,631 random sera and found 332 clinically insignificant antibodies when using LISS suspended RBC and a polyspecific antiglobulin serum. (Table 21).

We were able to further study 203 of these antibodies for their reactivity with monospecific antisera. In 160 of the 203 (79%) the positive reaction was caused by anticomplement antibodies in the antiglobulin sera. (In 129 instances, we were not able to test the reactions using monospecific sera.) Using this incidence, one can calculate that the total number of clinically insignificant antibodies detected only as a result of the anticomplement component of antiglobulin serum is 262 (332 X .79); the incidence of clinically insignificant antibodies in the 11,631 sera is thus 2.3% (262/11,631).

As part of this same study we determined the incidence of clinically significant antibodies (i.e. anti-Jk^a) that are only detectable when using a polyspecific antiglobulin reagent which contains potent anticomplement to be realtively uncommon, that is, 1 in 7007 random sera (0.014%).

Since the prime objective of this contract is to provide data and recommendations for a rapid, reliable crossmatch technique of particular value for the military, we feel that the use of a polyspecific antiserum is not warranted in urgent military settings. This is because the time taken to detect and identify clinically insignificant antibodies is not justified by the rather small yield of clinically significant antibodies that would be detected by the anticomplement component of a polyspecific antiglobulin serum. Therefore, it is our recommendation that in active military situations (i.e. combat areas), only monospecific anti-IgG reagent be used with LISS suspended RBC in compatibility testing, antigen typing and antibody investigation procedures. However, we would advise that in peace time settings or in stable military situations that a polyspecific antiglobulin reagent continue to be utilized, although a prospective study, presently in progress in our laboratory (to be completed in 1981) may indicate that this is unnecessary or is not cost-effective.

Table 22 contains 75 antibody specificities which were clearly identifiable when using LISS suspended RBC with 10 minute incubation and a polyspecific antiglobulin serum. These include 44 clinically significant alloantibodies, 11 clinically significant autoantibodies and 21 antibody specificities generally considered to be clinically insignificant.

In the identification of these antibody specificities, including the sera containing multiple antibody specificities, we did not find any need for additional techniques. The sole use of LISS suspended RBC is adequate for the identification of RBC antibodies.

2. DETERMINATION OF THE OPTIMAL MEANS OF PREPARING, PACKAGING, STORING AND SHIPPING MATERIALS NECESSARY FOR THE USE OF LISS SOLUTIONS CONSIDERING MILITARY NEEDS

Various commercial manufacturers of low ionic strength solutions were investigated as to their packaging and cost per ml. It can be easily seen from Table 23 that there is a wide variation in commercial packaging and pricing of low ionic strength solutions. Some of these solutions are designed to be additives rather than used to make RBC suspensions. These additives are the more expensive low ionic strength solutions and are packaged in the smallest available volumes (10-50ml). In addition, they are packaged in glass which we feel is inappropriate in certain military settings.

The commercial packaging of low ionic strength saline media to be used as suspending solutions seems inappropriate for military use mainly because this results in the unnecessary shipment and storage of large volumes. Since the volumes of individual containers are small, being uniformly 200 ml, this would necessitate the need to stock multiple bottles which would become difficult to transport and store. Three of the four manufacturers supply these bottles as plastic while one manufacturer's product is supplied in a glass container. The cost for these suspending solutions ranges from 1.8¢/ml to 3.6¢/ml. We feel that the packaging of these reagents is not optimal considering military needs.

Large, bulk quantities of LISS can be easily and cheaply prepared using the formulation provided in Table 24. This LISS has been shown to be stable for up to 1 year stored at room temperature (Table 25). It can be prepared in large plastic containers similar to the carboys that commercial saline is supplied in and is used as a stock solution from which aliquots are drawn into smaller volume (200-500ml) squirt bottles for actual bench use. The cost of this bulk LISS solution is approximately 0.17¢/ml compared to 1.8¢/ml for the most inexpensive commercially supplied LISS (Table 23).

In our previous report (April 1978) we detected and investigated 37 LISS reactive antibodies found in screening 1001 sera from unselected hospital patients. These included 3 clinically significant antibodies and 34 clinically insignificant antibody specificities.

In a separate study not funded by the Army, we performed parallel testing of 6500 random sera sent for compatibility testing using this particular bulk LISS formulation. We found it to be comparable to albumin suspending methods in the detection of red blood cell antibodies (Table 26). No clinically significant RBC antibodies were detectable using albumin methodology that were not also detectable using LISS.

Eighty-four clinically significant antibodies were detected using detection cells suspended in this LISS formulation. This bulk LISS formulation is ideal for use in large military facilities or those facilities not located in active combat zones.

For facilities located in active combat areas, the LISS Emergency Packet formulation (Table 27) would seem to be a more realistic approach. Preweighed chemicals are packaged in plastic bag containers which are small (2½X3 inches), flat, and stable indefinitely when stored at room temperature. The packets can actually be carried in one's pocket and when diluted with 1000ml of water make LISS. It costs approximately 0.2¢/ml to initially prepare these packets, which includes 1 hour of an ASCP registered technologists time. However, the cost in terms of only the chemicals used in making these packets is approximately 0.08¢/ml. This does not include the cost, if any, for the water diluent. In tests with 411 random sera sent for compatibility testing the LISS Emergency Packet formulation was shown to be comparable to albumin for the detection of RBC antibodies using the shorter 10 minute incubation time (Table 28). The stability of this LISS preparation was determined to be at least 3 weeks after dilution with water (Table 29). Two of these packets are enclosed with this report for your scrutiny.

TABLE I

COMPARISON OF ABO TYPING USING SALINE

AND LISS SUSPENDED RED CELLS

Number	Red Cells Suspended to 5% in Saline				Red Cells Suspended in LISS			
	Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-B	Anti-A,B	Conclusion: Group
1	4	0	4	A	4	0	4	A
2	4	0	4	A	4	0	4	A
3	0	4	4	B	0	4	4	B
4	4	0	4	A	4	0	4	A
5	0	0	0	0	0	0	0	0
6	4	0	4	A	4	0	4	A
7	4	0	4	A	4	0	4	A
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	4	4	B	0	4	4	B
11	4	0	4	A	4	0	4	A
12	4	0	4	A	4	0	4	A
13	0	0	0	0	0	0	0	0
14	4	0	4	A	4	0	4	A
15	0	2^{MF}	2^{MF}	B	0	2^{MF}	2^{MF}	B
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	4	0	4	A	4	0	4	A
19	0	4	4	B	0	4	4	B
20	4	0	4	A	4	0	4	A
21	0	0	0	0	0	0	0	0

TABLE 1 (CONTINUED)

COMPARISON OF ABO TYPING USING SALINE

AND LISS SUSPENDED RED CELLS

	Red Cells Suspended to 5% in Saline				Red Cells Suspended to 5% in LISS			
Number	Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-B	Anti-A,B	Conclusion: Group
22	4	0	4	A	4	0	4	A
23	4	4	4	AB	4	4	4	AB
24	0	0	0	0	0	0	0	0
25	4	0	4	A	4	0	4	A
26	4	0	4	A	4	0	4	A
27	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0
29	4	0	4	A	4	0	4	A
30	0	0	0	0	0	0	0	0
31	4	0	4	A	4	0	4	A
32	4	0	4	A	4	0	4	A
33	4	0	4	A	4	0	4	A
34	4	4	4	AB	4	4	4	AB
35	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0
37	4	0	4	A	4	0	4	A
38	0	0	0	0	0	0	0	0
39	4	0	4	A	4	0	4	A
40	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0
42	4	0	4	A	4	0	4	A

TABLE 1 (CONTINUED)

COMPARISON OF ABO TYPING USING SALINE

AND LISS SUSPENDED RED CELLS

	Red Cells Suspended to 5% in Saline				Red Cells Suspended to 5% in LISS			
Number	Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-B	Anti-A,B	Conclusion: Group
43	4	0	4	A	4	0	4	A
44	0	4	4	B	0	4	4	B
45	0	0	0	0	0	0	0	0
46	4	0	4	A	4	0	4	A
47	0	0	0	0	0	0	0	0
48	0	4	4	B	0	4	4	B
49	0	4	4	B	0	4	4	B
50	4	0	4	A	4	0	4	A
51	0	4	4	B	0	4	4	B
52	0	0	0	0	0	0	0	0
53	4	4	4	AB	4	4	4	AB
54	0	0	0	0	0	0	0	0
55	4	0	4	A	4	0	4	A
56	4	0	4	A	4	0	4	A
57	0	0	0	0	0	0	0	0
58	4	0	4	A	4	0	4	A
59	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
61	4	0	4	A	4	0	4	A
62	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0

TABLE 1 (CONTINUED)

COMPARISON OF ABO TYPING USING SALINE

AND LISS SUSPENDED RED CELLS

Number	Red Cells Suspended to 5% in Saline				Red Cells Suspended to 5% in LISS			
	Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-B	Anti-A,B	Conclusion: Group
64	4	0	4	A	4	0	4	A
65	4	0	4	A	4	0	4	A
66	0	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0	0
68	4	0	4	A	4	0	4	A
69	0	0	0	0	0	0	0	0
70	4	0	4	A	4	0	4	A
71	0	0	0	0	0	0	0	0
72	4	0	4	A	4	0	4	A
73	0	4	4	B	0	4	4	B
74	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0
77	4	0	4	A	4	0	4	A
78	4	0	4	A	4	0	4	A
79	3	4	4	AB	4[FC]	4	4	AB
80	0	0	0	0	0	0	0	0
81	0	0	0	0	0	0	0	0
82	4	0	4	A	4	0	4	A
83	0	4	4	B	0	4	4	B
84	0	4	4	B	0	4	4	B

TABLE 1 (CONTINUED)

COMPARISON OF ABO TYPING USING SALINE

AND LISS SUSPENDED RED CELLS

	Red Cells Suspended to 5% in Saline				Red Cells Suspended to 5% in LISS			
Number	Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-B	Anti-A,B	Conclusion: Group
85	4	4	4	AB	4	4	4	AB
86	0	0	0	0	0	0	0	0
87	0	4	4	B	0	4	4	B
88	0	0	0	0	0	0	0	0
89	4	4	4	AB	4	4	4	AB
90	0	4	4	B	0	4	4	B
91	4	0	4	A	4	0	4	A
92	4	0	4	A	4	0	4	A
93	4	0	4	A	4	0	4	A
94	0	0	0	0	0	0	0	0
95	4^{FC}	4	4	AB	4^{FC}	4	4	AB
96	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0
98	4	4	4	AB	4	4	4	AB
99	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
101	0	4	4	B	0	4	4	B
102	0	0	0	0	0	0	0	0
103	0	0	0	0	0	0	0	0
104	4	0	4	A	4	0	4	A
105	0	0	0	0	0	0	0	0

TABLE 1 (CONTINUED)

COMPARISON OF ABO TYPING USING SALINE

AND LISS SUSPENDED RED CELLS

Number	Red Cells Suspended to 5% in Saline				Red Cells Suspended to 5% in LISS			
	Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-B	Anti-A,B	Conclusion: Group
106	4	0	4	A	4	0	4	A
107	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	0
110	4	0	4	A	4	0	4	A
111	0	0	0	0	0	0	0	0
112	4	0	4	A	4	0	4	A
113	0	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0
116	0	4	4	B	0	4	4	B
117	4	0	4	A	4	0	4	A
118	4	0	4	A	4	0	4	A
119	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
121	4	0	4	A	4	0	4	A
122	0	0	0	0	0	0	0	0
123	4	0	4	A	4	0	4	A
124	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0
126	0	0	0	0	0	0	0	0

TABLE 1 (CONTINUED)

COMPARISON OF ABO TYPING USING SALINE AND LISS SUSPENDED RED CELLS

Number	Red Cells Suspended to 5% in Saline				Red Cells Suspended [illegible] in LISS			
	Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-B	Anti-A,B	Conclusion: Group
127	0	0	0	0	0	0	0	0
128	4	0	4	A	4	0	4	A
129	0	0	0	0	0	0	0	0
130	0	4	4	B	0	4	4	B
131	4	4	4	AB	4	4	4	AB
132	4	0	4	A	4	0	4	A
133	4	0	4	A	4	0	4	A
134	4	0	4	A	4	0	4	A
135	4	0	4	A	4	0	4	A
136	0	0	0	0	0	0	0	0
137	0	0	0	0	0	0	0	0
138	4	0	4	A	4	0	4	A
139	0	0	0	0	0	0	0	0
140	0	4	4	B	0	4	4	B
141	0	0	0	0	0	0	0	0
142	4	0	4	A	4	0	4	A
143	4	0	4	A	4	0	4	A
144	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0
146	4	0	4	A	4	0	4	A
147	0	0	0	0	0	0	0	0

TABLE 1 (CONTINUED)

COMPARISON OF ABO TYPING USING SALINE

AND LISS SUSPENDED RED CELLS

Number	Red Cells Suspended to 5% in Saline				Red Cells Suspended to 5% in LISS			
	Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-B	Anti-A,B	Conclusion: Group
148	0	0	0	0	0	0	0	0
149	4	0	4	A	4	0	4	A
150	0	0	0	0	0	0	0	0
151	4	0	4	A	4	0	4	A
152	4	0	4	A	4	0	4	A
153	4	0	4	A	4	0	4	A
154	0	4	4	B	0	4	4	B
155	4	0	4	A	4	0	4	A
156	4	0	4	A	4	0	4	A
157	0	0	0	0	0	0	0	0
158	0	0	0	0	0	0	0	0
159	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0
161	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0
163	0	0	0	0	0	0	0	0
164	0	0	0	0	0	0	0	0
165	4	0	4	A	4	0	4	A
166	0	0	0	0	0	0	0	0
167	4	0	4	A	4	0	4	A
168	0	0	0	0	0	0	0	0

TABLE 1 (CONTINUED)

COMPARISON OF ABO TYPING USING SALINE

AND LISS SUSPENDED RED CELLS

Number	Red Cells Suspended to 5% in Saline				Red Cells Suspended to 5% in LISS			
	Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-B	Anti-A,B	Conclusion: Group
169	4	0	4	A	4	0	4	A
170	0	0	0	0	0	0	0	0
171	4	0	4	A	4	0	4	A
172	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0
174	4	0	4	A	4	0	4	A
175	0	0	0	0	0	0	0	0
176	4	0	4	A	4	0	4	A
177	0	0	0	0	0	0	0	0
178	4	0	4	A	4	0	4	A
179	4	0	4	A	4	0	4	A
180	0	0	0	0	0	0	0	0
181	4	0	4	A	4	0	4	A
182	4	4	4	AB	4	4	4	AB
183	0	0	0	0	0	0	0	0
184	4	4	4	AB	4	4	4	AB
185	4	0	4	A	4	0	4	A
186	0	0	0	0	0	0	0	0
187	4	0	4	A	4	0	4	A
188	0	0	0	0	0	0	0	0
189	4	0	4	A	4	0	4	A

TABLE 1 (CONTINUED)

COMPARISON OF ABO TYPING USING SALINE

AND LISS SUSPENDED RED CELLS

Number	Red Cells Suspended to 5% in Saline: Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Red Cells Suspended to 5% in LISS: Anti-A	Anti-B	Anti-A,B	Conclusion: Group
190	4	0	4	A	4	0	4	A
191	0	4	4	B	0	4	4	B
192	0	4	4	B	0	4	4	B
193	0	4	4	B	0	4	4	B
194	0	0	0	0	0	0	0	0
195	4	0	4	A	4	0	4	A
196	0	0	0	0	0	0	0	0
197	4	0	4	A	4	0	4	A
198	0	4	4	B	0	4	4	B
199	4	4	4	AB	4	4	4	AB
200	0	0	0	0	0	0	0	0

MF=mixed field

FC=free cells

TABLE 2

COMPARISON OF ABO SUBGROUP TYPING USING SALINE AND LISS SUSPENDED RED CELLS

	Red Cells Suspended to 5% in Saline					Red Cells Suspended to 5% in LISS				
Number	Anti-A	Anti-A_1	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-A_1	Anti-B	Anti-A,B	Conclusion: Group
1	2+	0	4+	4+	A_2B	2+	0	4+	4+	A_2B
2	2½+	0	4+	4+	A_2B	3+	0	4+	4+	A_2B
3	2½+	0	4+	4+	A_2B	3+	0	4+	4+	A_2B
4	1+	0	4+	4+	A_2B	1½+	0	4+	4+	A_2B
5	3+	0	4+	4+	A_2B	3+	0	4+	4+	A_2B
6	2½+	0	4+	4+	A_2B	3+	0	4+	4+	A_2B
7	2½+	0	4+	4+	A_2B	2½+	0	4+	4+	A_2B
8	4+	0	0	4+	A_2	4+	0	0	4+	A_2
9	4+	0	0	4+	A_2	4+	0	0	4+	A_2
10	4+	0	0	4+	A_2	4+	0	0	4+	A_2
11	4+	0	0	4+	A_2	4+	0	0	4+	A_2
12	4+	0	0	4+	A_2	4+	0	0	4+	A_2
13	(½)	0	0	1½+	Ax	(½)	0	0	1+	Ax
14	0	0	0	1+	Ax	0	0	0	1+	Ax
15	0	0	0	½+	Ax	0	0	0	(1)	Ax

TABLE 3

COMPARISON OF CORD BLOOD ABO TYPING USING

SALINE AND LISS SUSPENDED RED CELLS

	Red Cells Suspended to 5% in Saline				Red Cells Suspended to 5% in LISS			
Number	Anti-A	Anti-B	Anti-A,B	Conclusion: Group	Anti-A	Anti-B	Anti-A,B	Conclusion: Group
1	3½+	0	4+	A	4+	0	4+	A
2	3½+	0	3½+	A	3½+	0	3½+	A
3	0	4+	4+	B	0	4+	4+	B
4	3½+	0	3½+	A	3½+	0	3½+	A

TABLE 4

Rh phenotyping

	RBC Saline Suspended					RBC LISS Suspended				
Donor	Anti-D	Anti-C	Anti-c	Anti-E	Anti-e	Anti-D	Anti-C	Anti-c	Anti-E	Anti-e
1	0	0	4+	0	2½+	0	0	4+	0	3+
2	3½+	2½+	3+	0	2½+	4+	3+	4+	0	2+
3	4+	4+	4+	0	3+	4+	3½+	4+	0	4+
4	0	0	4+	0	3+	0	0	4+	0	2½+
5	4+	2+	1+	0	3+	4+	2½+	1½+	0	4+
6	4+	0	4+	3+	1½+	4+	0	4+	2+	4+
7	3½+	1½+	4+	0	4+	3½+	2+	4+	0	4+
8	4+	1½+	4+	0	2½+	4+	2+	4+	0	3+
9	0	0	4+	0	3½+	0	0	4+	0	3½+
10	2½+	0	4+	2+	0	1+	0	4+	2½+	0
11	4+	0	4+	4+	3½+	4+	0	4+	4+	3½+
12	4+	0	4+	0	4+	4+	0	4+	0	3+
13	4+	2½+	3+	0	3+	3½+	3+	3½+	0	4
14	3½+	3½+	0	0	2+	3½+	3+	0	0	1½+
15	3+	0	4+	2½+	2½+	4+	0	4+	2½+	2½+
16	4+	0	4+	2½+	2½+	4+	0	4+	3½+	3½+
17	2½+	0	3+	1+	4+	4+	0	4+	2½+	4+
18	4+	2½+	2½+	1+	4+	4+	2½+	1½+	1½+	4+
19	2½+	1+	3½+	1+	4+	3½+	2+	4+	1½+	4+

TABLE 4 (CONTINUED)

Rh phenotyping

Donor	RBC Saline Suspended					RBC LISS Suspended				
	Anti-D	Anti-C	Anti-c	Anti-E	Anti-e	Anti-D	Anti-C	Anti-c	Anti-E	Anti-e
20	2+	1½+	2½+	1½+	4+	3+	2+	3½+	1+	4+
21	2+	0	4+	2+	1½+	3½+	0	4+	3½+	1+
22	4+	1+	4+	2½+	4+	4+	1+	4+	3½+	4+
23	1+	2+	0	0	4+	4+	2+	0	0	4+
24	4+	2+	2+	1+	4+	4+	2½+	2+	1+	3½+
25	3½+	2½+	3+	1½+	3½+	3½+	3+	3+	2+	4+
26	2½+	2½+	0	0	4+	4+	2½+	0	0	3½+
27	4+	2½+	2½+	1+	3½+	4+	3+	3+	1+	3½+
28	4+	2½+	4+	3+	3+	4+	3½+	4+	3½+	2½+
29	4+	2+	0	3+	3+	2½+	1+	0	2+	2+
30	4+	2+	0	0	3+	3½+	2½+	0	0	3+
31	3+	0	2½+	3+	0	4+	0	3+	3½+	0
32	4+	0	4+	0	3½+	4+	0	4+	0	3+
33	0	2½+	2+	0	4+	0	2½+	1½+	0	2½+
34	0	0	3½+	2+	2+	0	0	3+	2½+	2+
35	0	0	2½+	0	4+	0	0	2½+	0	2+
36	0	0	3½+	0	2+	0	0	3+	0	2½+
37	2½+	2+	0	0	2½+	3+	2½+	0	0	3+
38	4+	0	4+	0	2½+	4+	0	3+	0	2½+

TABLE 4 (CONTINUED)

Rh phenotyping

	RBC Saline Suspended					RBC LISS Suspended				
Donor	Anti-D	Anti-C	Anti-c	Anti-E	Anti-e	Anti-D	Anti-C	Anti-c	Anti-E	Anti-e
39	0	0	4+	0	4+	0	0	4+	0	4+
40	0	0	4+	0	3+	0	0	4+	0	4+
41	0	3+	4+	0	4+	0	4+	4+	0	4+
42	0	0	4+	4+	0	0	0	4+	4+	0
43	2+	0	4+	0	4+	2½+	0	4+	0	4+
44	2+	2+	4+	0	3½+	3+	2+	4+	0	4+
45	0	0	4+	0	3+	0	0	4+	0	4+
46	2½+	4+	0	0	4+	2½+	4+	0	0	4+
47	2½+	4+	0	0	2½+	2½+	4+	0	0	4+
48	3+	0	4+	4+	0	3+	0	4+	4+	0
49	3+	4+	0	0	4+	3+	4+	0	0	4+
50	3+	4+	0	4+	2½+	3½+	4+	0	4+	2½+
51	2½+	4+	0	0	3+	3+	4+	0	0	2½+
52	3½+	0	4+	4+	0	4+	0	4+	4+	0
53	3+	0	4+	0	3+	3½+	0	4+	0	3+
54	0	3½+	3+	0	4+	0	3½+	2½+	0	4+
55	0	0	4+	4+	4+	0	0	4+	4+	4+
56	0	0	4+	0	4+	0	0	4+	0	3+
57	0	0	4+	0	4+	0	0	4+	0	4+
58	4+	4+	2+	2½+	2½+	3½+	3+	3+	3+	3+

TABLE 4 (CONTINUED)

Rh phenotyping

	RBC Saline Suspended					RBC LiSS Suspended				
Donor	Anti-D	Anti-C	Anti-c	Anti-E	Anti-e	Anti-D	Anti-C	Anti-c	Anti-E	Anti-e
59	3+	3+	3+	3+	2½+	4+	4+	4+	4+	3½+
60	2½+	4+	0	0	4+	3½+	4+	0	0	4+
61	0	0	3+	0	4+	0	0	3½+	0	3½+
62	0	0	4+	0	4+	0	0	3½+	0	3½+
63	0	0	3+	0	4+	0	0	3½+	0	3½+
64	0	0	3+	0	3½+	0	0	3½+	0	3½+
65	0	0	3+	0	3+	0	0	3½+	0	4+
66	2+	4+	0	0	2+	2½+	4+	0	0	4+
67	3+	0	4+	4+	0	4+	0	4+	4+	0
68	0	0	4+	0	4+	0	0	4+	0	3+
69	3+	3½+	0	0	3½+	3+	4+	0	0	4+
70	3+	0	3½+	3½+	0	3+	0	4+	4+	0
71	3+	3½+	0	0	4+	2½+	3½+	0	0	3½+
72	4+	0	4+	4+	0	3½+	0	4+	4+	0
73	3½+	4+	4+	0	4+	4+	4+	4+	0	4+
74	3½+	4+	4+	0	4+	3½+	4+	3½+	0	4+
75	2+	0	4+	4+	2+	3+	0	4+	4+	2½+

TABLE 5

Anti-C^W

Donor	C^W	RBC Saline Suspended IS	RBC Saline Suspended 37C(15 min)	RBC LISS Suspended IS	RBC LISS Suspended 37C(15 min)
1	+	1+	2+	2+	2½+
2	+	1+	2½+	1+	2½+
3	+	0	2+	1+	2½+
4	0	0	0	0	0
5	+	½+	2+	1+	2+
6	+	½+	2+	1+	2½+
7	+	½+	2+	1+	2½+
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0	0	0	0
12	0	0	0	0	0
13	0	0	0	0	0
14	+	1+	3½+	1+	3½+
15	+	1+	3½+	1½+	3+
16	+	½+	3½+	1+	3+
17	+	1+	3½+	1½+	3½+

TABLE 6

Anti-Kell

Donor	K	k	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
1	0	+	0	0
2	0	+	0	0
3	0	+	0	0
4	0	+	0	0
5	0	+	0	0
6	0	+	0	0
7	+	+	2+	2½+
8	0	+	0	0
9	+	+	2+	2+
10	0	+	0	0
11	0	+	0	0
12	0	+	0	0
13	0	+	0	0
14	0	+	0	0
15	0	+	0	0
16	0	+	0	0
17	+	+	1½+	2+
18	0	+	0	0
19	0	+	0	0
20	+	0	2+	2½+
21	+	+	2+	2½+

TABLE 6 (CONTINUED)

Anti-Kell

Donor	K	k	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
22	+	+	2+	2½+
23	+	+	3+	3+
24	+	+	2+	2+
25	+	0	2½+	2+
26	+	+	1½+	2½+
27	+	+	2+	3+
28	+	+	2½+	2+
29	+	+	2½+	2½+
30	+	0	2½+	2½+
31	+	+	2½+	2½+
32	+	+	2½+	2½+
33	+	+	2+	2+
34	+	+	2+	2+
35	+	0	2½+	2½+

TABLE 7

Anti-k (Cellano)

Donor	K	k	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
1	0	+	3+	3+
2	0	+	3+	2½+
3	0	+	3+	3+
4	0	+	3½+	3+
5	0	+	3+	2½+
6	0	+	2½+	3+
7	+	+	2+	2½+
8	0	+	3+	3+
9	+	+	2½+	2½+
10	0	+	2½+	2½+
11	0	+	3+	3+
12	0	+	2½+	3+
13	0	+	3+	3+
14	0	+	2½+	3+
15	0	+	2½+	3+
16	0	+	2½+	3+
17	+	+	3½+	3½+
18	0	+	3½+	3½+
19	0	+	3½+	3½+
20	+	0	0	0

TABLE 7 (CONTINUED)

Anti-k (Cellano)

Donor	K k	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
21	+ +	4+	4+
22	+ +	4+	4+
23	+ +	3+	3½+
24	+ +	2½+	2½+
25	+ 0	0	0
26	+ +	2½+	2½+
27	+ +	2½+	3+
28	+ +	2½+	2½+
29	+ +	2½+	3+
30	+ 0	0	0
31	+ +	3+	3½+
32	+ +	3+	3½+
33	+ +	2½+	3½+
34	+ +	2½+	2½+
35	+ 0	0	0

TABLE 8

Anti-Kp[a]

Donor	Kp[a]	Kp[b]	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
1	+	+	2+	1½+
2	+	+	2+	2+
3	+	+	2+	2+
4	+	+	2+	2+
5	+	+	2+	2+
6	+	+	1+	2½+
7	0	+	0	0
8	0	+	0	0
9	0	+	0	0
10	0	+	0	0
11	0	+	0	0
12	0	+	0	0
13	+	+	2+	1½+
14	+	+	2+	1½+
15	+	+	2+	2+
16	+	+	3+	2+
17	+	+	2½+	2½+
18	+	+	2+	2+

TABLE 9

Anti-Fy^a

Donor	Fy^a	Fy^b	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
1	+	0	2½+	3+
2	+	+	2½+	3+
3	+	+	3+	3+
4	0	0	0	0
5	+	+	2½+	2½+
6	+	0	2½+	3½+
7	0	+	0	0
8	+	0	2½+	3+
9	0	+	0	0
10	0	0	0	0
11	+	+	1½+	2+
12	0	+	[illegible]	0
13	+	0	2+	1½+
14	0	0	0	0
15	+	+	2+	1½+
16	+	+	2+	1½+
17	0	+	0	0
18	+	0	2½+	2+
19	0	0	0	0
20	+	+	2½+	2+
21	+	0	2+	2+
22	+	+	1+	1+

TABLE 10

Anti-Fy^b

Donor	Fy^a	Fy^b	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
1	+	0	0	0
2	+	+	2½+	2+
3	+	+	2+	2½+
4	0	0	0	0
5	+	+	2½+	2½+
6	+	0	0	0
7	0	+	2+	2+
8	+	0	0	0
9	0	+	1½+	2+
10	0	0	0	0
11	+	+	1½+	2+
12	0	+	1½+	2+
13	+	0	0	0
14	0	0	0	0
15	+	+	2+	1½+
16	+	+	2+	2+
17	0	+	1+	1+
18	+	0	0	0
19	0	0	0	0
20	+	+	2+	1½+
21	+	0	0	0
22	+	+	1+	1½+

TABLE 11

Anti-Jk^a

Donor	Jk^a	Jk^b	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
1	+	0	2½+	2½+
2	0	+	0	0
3	0	+	0	0
4	+	0	3+	2½+
5	0	+	0	0
6	+	0	2+	2+
7	+	0	1½+	2½+
8	+	+	1½+	1½+
9	+	+	1+	1+
10	+	0	1½+	2½+
11	0	+	0	0
12	+	+	1½+	1½+
13	+	0	1½+	1½+
14	+	0	1+	1+
15	+	0	2+	1+
16	0	+	0	0
17	0	+	0	0
18	+	+	1+	1½+
19	+	0	1+	1½+
20	+	+	1+	1+

TABLE 11 (CONTINUED)

Anti-Jk^a

Donor	Jk^a	Jk^b	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
21	+	+	1+	1+
22	+	0	1+	1½+
23	0	+	0	0
24	+	+	2+	1+
25	0	+	0	0
26	+	0	½+	1½+
27	+	+	1½+	1½+
28	0	+	0	0
29	+	+	1+	1+
30	+	+	1½+	1½+
31	0	+	0	0
32	+	+	1½+	1+
33	+	+	1+	1+
34	+	+	1½+	1½+

TABLE 12

Anti-Jk^b

Donor	Jk^a	Jk^b	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
1	+	0	0	0
2	0	+	2½+	1½+
3	0	+	2½+	2+
4	+	0	0	0
5	0	+	2+	1½+
6	+	0	0	0
7	+	0	0	0
8	+	+	1+	1+
9	+	+	½+	½+
10	+	0	0	0
11	0	+	1½+	2+
12	+	+	1+	1½+
13	+	0	0	0
14	+	0	0	0
15	+	0	0	0
16	0	+	1+	2½+
17	0	+	1½+	1½+
18	+	+	1+	1+
19	+	0	0	0
20	+	+	1+	1+

TABLE 12 (CONTINUED)

Anti-Jk^b

Donor	Jk^a	Jk^b	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
21	+	+	1+	1+
22	+	0	0	0
23	0	+	(1)	1+
24	+	+	($\frac{1}{2}$)	$\frac{1}{2}$+
25	0	+	$\frac{1}{2}$+	1$\frac{1}{2}$+
26	+	0	0	0
27	+	+	(1)	1+
28	0	+	1+	2+
29	+	+	1+	1+
30	+	+	2+	2+
31	0	+	2+	2$\frac{1}{2}$+
32	+	+	(1)	1+
33	+	+	1$\frac{1}{2}$+	1$\frac{1}{2}$+
34	+	+	1+	1$\frac{1}{2}$+

TABLE 13

Anti-S

Donor	S	s	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
1	0	+	0	0
2	0	+	0	0
3	0	+	0	0
4	0	0	0	0
5	+	+	2+	2½+
6	+	+	2½+	3+
7	0	+	0	0
8	+	+	2½+	2½+
9	0	+	0	0
10	+	+	2+	2+
11	+	+	1+	1½+
12	+	0	1½+	1½+
13	+	+	1½+	1½+
14	0	0	0	0
15	+	+	1+	1½+
16	0	+	0	0
17	+	+	2+	2+
18	+	+	2+	2+
19	0	+	0	0
20	+	+	1½+	1½+

TABLE 13 (CONTINUED)

Anti-S

Donor	S	s	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
21	+	0	1½+	1½+
22	+	0	1½+	1½+
23	0	+	0	0
24	+	+	1+	1+
25	0	+	0	0
26	0	+	0	0
27	+	+	1+	2½+
28	+	+	1+	2+
29	+	+	½+	½+
30	+	+	1+	2+
31	+	0	1+	2½+
32	0	+	0	0
33	+	0	2+	2½+
34	+	+	1½+	1½+

TABLE 14

Anti-s

Donor	S	s	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
1	0	+	2+	2½+
2	0	+	2+	2½+
3	0	+	3+	3+
4	0	0	0	0
5	+	+	2+	2½+
6	+	+	2+	2½+
7	0	+	2+	2+
8	+	+	1½+	2+
9	0	+	2½+	1½+
10	+	+	1½+	1+
11	+	+	1+	1½+
12	+	0	0	0
13	+	+	1½+	1½+
14	0	0	0	0
15	+	+	2½+	2+
16	0	+	2½+	2+
17	+	+	2½+	2+
18	+	+	1+	2+
19	0	+	1½+	2½+
20	+	+	2+	2½+
21	+	0	0	0

TABLE 14 (CONTINUED)

Anti-s

Donor	S	s	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
22	+	0	0	0
23	0	+	3+	3½+
24	+	+	1½+	1½+
25	0	+	1+	2+
26	0	+	1½+	1½+
27	+	+	1½+	2+
28	+	+	1½+	1½+
29	+	+	1½+	1½+
30	+	+	1½+	1½+
31	+	0	0	0
32	0	+	1½+	1½+
33	+	0	0	0
34	+	+	1+	2+

TABLE 15

Anti-Co^b

Donor	Co^a	Co^b	RBC Saline Suspended (30 min IAT)	RBC LISS Suspended (10 min IAT)
1	+	+	1+	1½+
2	+	+	1½+	1½+
3	+	+	1½+	1+
4	+	+	1+	1+
5	+	+	1+	1+
6	+	+	1+	1+
7	+	+	1+	½+
8	+	+	1+	1+

TABLE 16

Anti-Le^a

Donor	Le^a	Le^b	RBC Saline Suspended	RBC LISS Suspended
1	0	+	0	0
2	0	+	0	0
3	0	+	0	0
4	0	0	0	0
5	+	0	1½+	1½+
6	+	0	2½+	2+
7	0	+	0	0
8	+	0	2+	1+
9	0	+	0	0
10	0	+	0	0
11	0	0	0	0
12	0	+	0	0
13	0	+	0	0
14	0	+	0	0
15	0	0	0	0
16	0	+	0	0
17	0	+	0	0
18	+	0	1½+	1½+
19	0	0	0	0
20	0	+	0	0
21	+	0	1½+	2+

TABLE 16 (CONTINUED)

Anti-Le^a

Donor	Le^a	Le^b	RBC Saline Suspended	RBC LISS Suspended
22	0	+	0	0
23	0	+	0	0
24	0	+	0	0
25	0	+	0	0
26	+	0	1+	2½+
27	0	+	0	0
28	0	+	0	0
29	0	+	0	0
30	0	+	0	0
31	+	0	1½+	2½+
32	0	+	0	0
33	0	+	0	0
34	0	+	0	0
35	+	0	1+	1½+
36	+	0	1+	1+
37	+	0	1½+	1½+
38	+	0	1½+	1+
39	+	0	1+	2+
40	+	0	1+	1+

TABLE 16 (CONTINUED)

Anti-Le^a

Donor	Le^a	Le^b	RBC Saline Suspended	RBC LISS Suspended
41	+	0	2+	2+
42	+	0	1½+	2+
43	+	0	1+	2+
44	+	0	1+	1+

TABLE 17

Anti-Le^b

Donor	Le^a	Le^b	RBC Saline Suspended	RBC LISS Suspended
1	0	+	3+	$2\frac{1}{2}$+
2	0	+	3+	3+
3	0	+	$2\frac{1}{2}$+	$2\frac{1}{2}$+
4	0	0	0	0
5	+	0	0	0
6	+	0	0	0
7	0	+	$3\frac{1}{2}$+	$3\frac{1}{2}$+
8	+	0	0	0
9	0	+	4+	4+
10	0	+	2+	2+
11	0	0	0	0
12	0	+	2+	3+
13	0	+	$3\frac{1}{2}$+	$3\frac{1}{2}$+
14	0	+	$2\frac{1}{2}$+	4+
15	0	0	0	0
16	0	+	4+	$3\frac{1}{2}$+
17	0	+	$2\frac{1}{2}$+	3+
18	+	0	0	0
19	0	0	0	0
20	0	+	$3\frac{1}{2}$+	4+
21	+	0	0	0
22	0	+	$3\frac{1}{2}$+	3+

TABLE 17

Anti-Le^b

Donor	Le^a	Le^b	RBC Saline Suspended	RBC LISS Suspended
23	0	+	3+	4+
24	0	+	3+	4+
25	0	+	3+	4+
26	+	0	0	0
27	0	+	3½+	4+
28	0	+	3+	4+
29	0	+	3½+	4+
30	0	+	3½+	3½+
31	+	0	0	0
32	0	+	2½+	3+
33	0	+	3½+	4+
34	0	+	3½+	4+

TABLE 18

Anti-P_1

Donor	P_1	RBC Saline Suspended	RBC LISS Suspended
1	0	0	0
2	+	2½+	2½+
3	+	2½+	2½+
4	+	2½+	2½+
5	0	0	0
6	0	0	0
7	+	2½+	2½+
8	+	2½+	2+
9	+	1½+	2+
10	0	0	0

TABLE 19

Anti-M

Donor	M	N	RBC Saline Suspended	RBC LISS Suspended
1	0	+	0	0
2	+	0	4+	3+
3	+	+	$2^1/_2$+	2+
4	0	+	0	0
5	+	+	$2^1/_2$+	$2^1/_2$+
6	+	+	$2^1/_2$+	$2^1/_2$+
7	+	+	3+	3+
8	+	+	2+	2+
9	0	+	0	0
10	0	+	0	0

TABLE 20

Anti-N

Donor	M	N	RBC Saline Suspended	RBC LISS Suspended
1	0	+	2+	1+
2	+	0	0	0
3	+	+	3+	1+
4	0	+	2½+	1+
5	+	+	1½+	1½+
6	+	+	2½+	2½+
7	+	+	2½+	2½+
8	+	+	4+	4+
9	0	+	2½+	2½+
10	0	+	3+	3+

TABLE 21

CLINICALLY INSIGNIFICANT ANTIBODIES DETECTED USING LOW-IONIC STRENGTH SOLUTION ANTIGLOBULIN TECHNIQUE (LISS-AGT) IN TESTING 11,631 RANDOM SERA SENT FOR COMPATIBILITY TESTING

Specificity	IgG Only	IgG + C3	C3	C4 Only	Tested Using Poly-specific Only
Nonspecific (195)	10	5	54	28	98
Anti-I (30)	2	1	9	6	12
Anti-IH (10)	0	1	7	2	0
Anti-H (5)	0	0	4	1	0
Anti-i (1)	0	1	0	0	0
Anti-Le^b (10)	0	1	5	1	3
Anti-Le^a (64)	0	17	22	13	12
Anti-P_1 (15)	0	5	1	6	3
Anti-N (1)	0	0	1	0	1
TOTAL (332)	12	31	103	57	129#

We estimate that approximately 79% of these antibodies will react primarily with complement components (C3 and/or C4).

NOTE: Approximately 43% of these antibodies are still detectable when strict prewarm technique is employed using a poly-specific antiglobulin reagent.

TABLE 22

ANTIBODIES IDENTIFIABLE USING

LISS-ANTIGLOBULIN TECHNIQUE (LISS-AGT)

Antibody(ies) Identified	Number Identified
Anti-D	9
Anti-D+C	2
Anti-D+Kell	1
Anti-C	1
Anti-E	11
Anti-E+Kell	1
Anti-E+Kell+C^w	1
Anti-E+c	1
Anti-c	2
Anti-V	1
Anti-Kell	8
Anti-Jk^a	1
Anti-Jk^b	2
Anti-Fy^a	2

TABLE 22 (CONTINUED)

ANTIBODIES IDENTIFIABLE USING

LISS-ANTIGLOBULIN TECHNIQUE (LISS-AGT)

Antibody(ies) Identified	Number Identified
Anti-Le^a	7
Anti-Le^b	2
Anti-Le^a+Le^b	1
Anti-P_1	1
Anti-M	1
Anti-Sd^a	1
Anti-Lu^a	3
Anti-I (IH)	4
Anti-ILe^{bH}	1
Warm autoantibody-no apparent specificity	11
TOTAL ANTIBODIES IDENTIFIED	75

TABLE 23

COMPARISON OF THE COST OF LOW-IONIC STRENGTH SOLUTIONS

Manufacturer	Name of Product	Type of Reagent	Largest Unit Volume Available (ml)	List* Price	Approximate cost/ml
Ortho Diagnostics	LISS	Suspending	200	5.88	2.9¢
	Antibody Enhancement Solution	Additive	10	7.35	73.5¢
Pfizer Diagnostics	LISS	Suspending	200	7.25	3.6¢
Hyland Therapeutics	LISS	Suspending	200	6.33	3.2¢
Biological Corp. of America	EM-V	Additive	10	3.20	3.2¢
	SpecTRIM	Suspending	200	3.60	1.8¢**
Dade	Enlisst	Additive	50	26.00	52.0¢
Gamma Biologicals	Lo-Ion	Additive	50	32.50	65.0¢
LISS Bulk Solution (Table 24)		Suspending	10000	N/A	0.17¢T
LISS Emergency Packet (Table 27)		Suspending	1000	N/A	0.20¢**T 0.08¢#

N/A = Not Applicable
* = 1981 Pricing
** = Does not include cost of water used as diluent.
T = includes 1 hour of technologist time to prepare the reagent.
# = Cost per ml if packet already preweighed.

TABLE 24

LISS FORMULATION (BULK SOLUTION)- 10 LITERS

glycine	180	grams
NaCl	17.5	grams
NaN_3 (Na azide)	3	grams
0.15M KH_2PO_4	120	ml
0.15M Na_2HPO_4	80	ml
H_2O (Sterile)*	9.8	liters

adjust pH to 6.7 using 1.0N NaOH (~5.3ml)

storage: room temperature

stability: at least 1 year

preservative: sodium azide (0.03%)

* McGaw sterile water for irrigation

TABLE 25

STABILITY OF BULK LISS SOLUTION*

Interval (month)	Na^+ (mEq/L)	Cl^- (mEq/L)	pH	Osmolality mOsm/KgH_2O	Molarity** (M/L)	Bacterial Culture
1	36	30	6.73	310	0.036	Negative
3	35	29	6.75	308	0.035	Negative
6	35	31	6.72	315	0.035	Negative
8	36	30	6.74	309	0.036	Negative
10	36	29	6.71	295	0.036	Negative
12	37	30	6.73	300	0.037	Negative

* Contains 0.03% sodium azide as a preservative.

** Derrived from the sodium measurement.

TABLE 26

ANTIBODIES DETECTED USING A

BULK LISS FORMULATION

Total random sera screened: 6500

Total clinically significant antibodies detected: 84

Total Clinically Insignificant antibodies detected (including Lewis and nonspecific): 295

Warm Autoantibody no apparent RBC specificity	4	Anti-Kell+Fy^a	1
Anti-D	18	Anti-Fy^a	5
Anti-D+Kell	1	Anti-Jk^a	1
Anti-D+C	4	Anti-Le^a	35
Anti-D+E	1	Anti-Le^b	7
Anti-E	18	Anti-Le^{a}Le^b	9
Anti-E+c	3	Anti-P_1	12
Anti-E+Jk^b	2	Anti-M	12
Anti-C	1	Anti-N	2
Anti-c	3	Anti-I(IH)	39
Anti-Kell	19	Anti-H	2
Anti-Kell+E	2	Anti-i	2
Anti-Kell+E+Fy^a+Jk^b	1	No Identifiable Specificity (nonspecific)	175

TABLE 27

LISS EMERGENCY PACKET FORMULATION

glycine	18	grams
NaCl	1.79	grams
NaN_3 (Na azide)	0.3	grams
KH_2PO_4	0.25	grams
Na_2HPO_4	0.17	grams

Preweighed chemicals are stable and can be packaged in small plastic bag containers for convenient transport and storage. Each packet is added to 1000ml of water to make LISS (0.03M).

TABLE 28

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA-Not Applicable; no differences in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
1	0	0	0	0	N/A
2	0	0	0	0	N/A
3	0	0	0	0	N/A
4	0	0	0	0	N/A
5	0	0	0	0	N/A
6	0	0	0	0	N/A
7	0	0	0	0	N/A
8	0	0	0	0	N/A
9	0	0	0	0	N/A
10	0	0	0	0	N/A
11	0	0	0	0	N/A
12	0	0	0	0	N/A
13	0	0	0	0	N/A
14	0	0	0	0	N/A
15	0	0	0	0	N/A
16	0	0	0	0	N/A
17	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	LIS	AGT	LIS	AGT	
18	0	0	0	0	N/A
19	0	0	0	0	N/A
20	0	0	0	0	N/A
21	1	½	1	1½	Anti-E+Le^a
22	1	1	1	1	Anti-E+Le^a
23	0	0	0	0	N/A
24	0	0	0	0	N/A
25	0	0	0	0	N/A
26	0	0	0	0	N/A
27	0	0	0	0	N/A
28	0	0	0	0	N/A
29	0	0	0	0	N/A
30	0	0	0	0	N/A
31	0	0	0	0	N/A
32	2	0	2	0	Anti-M; not detectable using Albumin.
33	0	0	0	0	N/A
34	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
35	0	0	0	0	N/A
36	0	0	0	0	N/A
37	0	0	0	0	N/A
38	0	0	0	0	N/A
39	0	0	0	0	N/A
40	0	0	0	0	N/A
41	0	0	0	0	N/A
42	0	0	0	0	N/A
43	0	0	0	0	N/A
44	0	0	0	0	N/A
45	0	0	0	0	N/A
46	0	0	0	0	N/A
47	0	0	0	0	N/A
48	0	0	0	0	N/A
49	0	0	0	0	N/A
50	0	0	0	0	N/A
51	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no differences in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
52	0	0	0	0	N/A
53	0	0	0	0	N/A
54	0	0	0	0	N/A
55	0	0	0	0	N/A
56	0	0	0	0	N/A
57	0	0	0	0	N/A
58	0	0	0	0	N/A
59	0	(1)	0	0	Nonspecific; complement binding only.
60	0	0	0	0	N/A
61	0	0	0	0	N/A
62	0	(1)	0	0	Nonspecific; complement binding only.
63	0	0	0	0	N/A
64	0	0	0	0	N/A
65	0	0	0	0	N/A
66	0	0	0	0	N/A
67	0	0	0	0	N/A
68	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA Not Applicable: no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
69	0	0	0	0	N/A
70	0	0	0	0	N/A
71	0	0	0	0	N/A
72	0	0	0	0	N/A
73	0	0	0	0	N/A
74	0	0	0	0	N/A
75	0	0	0	0	N/A
76	0	0	0	0	N/A
77	0	0	0	0	N/A
78	0	0	0	0	N/A
79	0	0	0	0	N/A
80	0	0	0	0	N/A
81	0	0	0	0	N/A
82	0	0	0	0	N/A
83	0	0	0	0	N/A
84	0	0	0	0	N/A
85	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
86	0	0	0	0	N/A
87	0	0	0	0	N/A
88	0	0	0	0	N/A
89	0	0	0	0	N/A
90	0	0	0	0	N/A
91	0	(½)	0	(½)	Nonspecific; not detectable using Albumi
92	0	0	0	0	N/A
93	0	0	0	0	N/A
94	0	0	0	0	N/A
95	0	0	0	0	N/A
96	0	(½)	0	(½)	Nonspecific; not detable using Albumin.
97	0	0	0	0	N/A
98	0	0	0	0	N/A
99	0	0	0	0	N/A
100	0	0	0	0	N/A
101	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
102	0	0	0	0	N/A
103	0	0	0	3	Anti-Kell
104	0	0	0	0	N/A
105	0	0	0	0	N/A
106	0	0	0	0	N/A
107	0	0	0	0	N/A
108	0	0	0	0	N/A
109	0	0	0	0	N/A
110	0	0	0	0	N/A
111	0	0	0	0	N/A
112	0	0	0	0	N/A
113	0	0	0	0	N/A
114	0	0	0	0	N/A
115	0	0	0	0	N/A
116	0	0	0	0	N/A
117	0	0	0	0	N/A
118	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
119	0	0	0	0	N/A
120	0	0	0	0	N/A
121	0	0	0	0	N/A
122	0	0	0	0	N/A
123	0	0	0	0	N/A
124	0	0	0	0	N/A
125	0	0	0	0	N/A
126	0	0	0	0	N/A
127	0	0	0	0	N/A
128	0	0	0	0	N/A
129	0	0	0	0	N/A
130	0	0	0	0	N/A
131	0	0	0	0	N/A
132	0	0	0	0	N/A
133	0	0	0	0	N/A
134	0	0	0	0	N/A
135	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no differen in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
136	0	0	0	0	N/A
137	0	0	0	0	N/A
139	0	0	0	0	N/A
140	0	0	0	0	N/A
141	0	0	0	0	N/A
142	0	0	0	0	N/A
143	0	0	0	0	N/A
144	0	0	0	0	N/A
145	0	0	0	0	N/A
146	0	0	0	0	N/A
147	0	0	0	0	N/A
148	0	0	0	0	N/A
149	0	0	0	0	N/A
150	0	0	0	0	N/A
151	0	0	0	0	N/A
152	0	0	0	0	N/A
153	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
154	0	0	0	0	N/A
155	0	0	0	0	N/A
156	0	0	0	0	N/A
157	0	0	0	0	N/A
158	0	0	0	0	N/A
159	0	(½)	0	0	Nonspecific; not detectable using Albumin.
160	0	0	0	0	N/A
161	0	0	0	1	Anti-E+Le[a]
162	0	0	0	0	N/A
163	0	0	0	0	N/A
164	0	0	0	0	N/A
165	2	0	2	0	Anti-I; not detectable using Albumin.
166	0	0	0	0	N/A
167	0	0	0	0	N/A
168	0	0	0	0	N/A
169	0	0	0	0	N/A
170	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA-Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	ACT	IS	ACT	
171	0	0	0	0	N/A
172	0	0	0	0	N/A
173	0	0	0	0	N/A
174	0	0	0	0	N/A
175	2	0	2	0	Anti-M
176	0	0	0	0	N/A
177	0	0	0	0	N/A
178	0	0	0	0	N/A
179	1	(½)	1	0	Nonspecific; not detectable using Albumin.
180	0	0	0	0	N/A
181	0	0	0	0	N/A
182	0	0	0	0	N/A
183	0	0	0	0	N/A
184	0	0	0	0	N/A
185	0	0	0	0	N/A
186	0	0	0	0	N/A
187	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no differences in test results using LISS or albumin methodology.)

Antibody Screening Results using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
188	0	0	0	0	N/A
189	0	0	0	0	N/A
190	1	0	0	0	Anti-P_1
191	0	0	0	0	N/A
192	0	0	0	0	N/A
193	0	0	0	0	N/A
194	0	0	0	0	N/A
195	0	0	0	0	N/A
196	0	0	0	0	N/A
197	0	0	0	0	N/A
198	0	0	0	0	N/A
199	0	0	0	0	N/A
200	0	0	0	0	N/A
201	0	0	0	0	N/A
202	0	0	0	0	N/A
203	0	0	0	0	N/A
204	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
205	0	0	0	0	N/A
206	0	0	0	0	N/A
207	0	0	0	0	N/A
208	0	0	0	0	N/A
209	0	0	0	0	N/A
210	0	0	0	0	N/A
211	0	0	0	0	N/A
212	0	0	0	0	N/A
213	0	0	0	0	N/A
214	0	0	0	0	N/A
215	0	0	0	0	N/A
216	0	0	0	0	N/A
217	0	0	0	0	N/A
218	0	0	0	0	N/A
219	0	0	0	0	N/A
220	0	0	0	0	N/A
221	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGING*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (N/A=Not applicable as no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
222	0	0	0	0	N/A
223	0	0	0	0	N/A
224	0	0	0	0	N/A
225	0	0	0	0	N/A
226	0	0	0	0	N/A
227	0	0	0	0	N/A
228	0	0	0	0	N/A
229	0	0	0	0	N/A
230	0	0	0	0	N/A
231	0	0	0	0	N/A
232	0	0	0	0	N/A
233	0	0	0	0	N/A
234	0	0	0	0	N/A
235	0	0	0	0	N/A
236	0	0	0	0	N/A
237	0	0	0	0	N/A
238	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
239	0	0	0	0	N/A
240	0	0	0	0	N/A
241	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA Not applicable; no differen in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
242	0	0	0	0	N/A
243	1	(1)	1	0	Anti-P_1;not detecta using Albumin
244	0	0	0	0	N/A
245	0	0	0	0	N/A
246	0	0	0	0	N/A
247	0	0	0	0	N/A
248	0	0	0	0	N/A
249	0	0	0	0	N/A
250	0	0	0	0	N/A
251	0	0	0	0	N/A
252	0	0	0	0	N/A
253	0	0	0	0	N/A
254	0	0	0	0	N/A
255	0	0	0	0	N/A
256	0	0	0	0	N/A
257	0	(½)	0	(½)	Nonspecific; not de able using Albumin
258	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED

IN LISS WHICH WAS PREPARED USING PREWETTED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (N/A Not Applicable: no differences in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
259	0	0	0	0	N/A
260	0	0	0	0	N/A
261	0	0	0	0	N/A
262	0	0	0	½	Nonspecific; not detectable using Albumin
263	0	0	0	0	N/A
264	0	0	0	0	N/A
265	0	0	0	0	N/A
266	0	0	0	0	N/A
267	0	0	0	0	N/A
268	0	0	0	0	N/A
269	0	0	0	0	N/A
270	0	0	0	0	N/A
271	0	0	0	0	N/A
272	0	0	0	0	N/A
273	0	0	0	0	N/A
274	0	0	0	0	N/A
275	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
276	0	0	0	(1)	Nonspecific;not detectable using Albumin
277	0	0	0	0	N/A
278	0	0	0	0	N/A
279	0	0	0	0	N/A
280	0	0	0	0	N/A
281	0	0	0	0	N/A
282	0	0	0	0	N/A
283	0	0	0	0	N/A
284	0	0	0	0	N/A
285	0	0	0	0	N/A
286	0	0	0	0	N/A
287	0	0	0	0	N/A
288	0	0	0	0	N/A
289	0	0	0	0	N/A
290	0	0	0	0	N/A
291	0	0	0	0	N/A
292	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED

IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (N/A-Not Applicable; no differences in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
293	0	0	0	0	N/A
294	0	0	0	0	N/A
295	0	0	0	0	N/A
296	0	0	0	0	N/A
297	0	0	0	0	N/A
298	0	0	0	0	N/A
299	0	0	0	0	N/A
300	0	(1)	0	0	Anti-Le^a
301	0	0	0	0	N/A
302	0	0	0	0	N/A
303	0	0	0	0	N/A
304	0	0	0	0	N/A
305	0	0	0	0	N/A
306	0	0	0	0	N/A
307	0	0	0	0	N/A
308	0	0	0	0	N/A
309	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED

IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (N/A Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
310	0	0	0	0	N/A
311	0	0	0	0	N/A
312	0	0	0	0	N/A
313	0	0	0	0	N/A
314	0	0	0	0	N/A
315	0	0	0	0	N/A
316	0	0	0	0	N/A
317	0	0	0	0	N/A
318	0	0	0	0	N/A
319	0	0	0	0	N/A
320	0	0	0	0	N/A
321	0	0	0	0	N/A
322	0	0	0	0	N/A
323	0	0	0	0	N/A
324	0	0	0	0	N/A
325	0	1½	0	0	Anti-Le^a
326	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA-Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
327	0	0	0	0	N/A
328	0	0	0	0	N/A
329	0	0	0	0	N/A
330	0	0	0	0	N/A
331	0	0	0	0	N/A
332	0	0	0	0	N/A
333	0	0	0	0	N/A
334	0	0	0	0	N/A
335	0	0	0	0	N/A
336	0	0	0	0	N/A
337	0	0	0	0	N/A
338	0	0	0	0	N/A
339	0	0	0	0	N/A
340	0	0	0	0	N/A
341	0	0	0	0	N/A
342	0	0	0	0	N/A
343	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
344	0	0	0	0	N/A
345	0	0	(1)	0	Anti-c+Wr^a
346	0	0	0	0	N/A
347	0	0	0	0	N/A
348	0	0	0	0	N/A
349	0	0	0	0	N/A
350	0	0	0	0	N/A
351	0	0	0	0	N/A
352	0	0	0	0	N/A
353	0	0	0	0	N/A
354	0	0	0	0	N/A
355	0	0	0	0	N/A
356	0	0	0	0	N/A
357	0	0	0	0	N/A
358	0	0	0	0	N/A
359	0	0	0	0	N/A
360	0	0	0	0	N/A
361	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no differences in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
362	0	0	0	0	N/A
363	0	0	0	0	N/A
364	0	0	0	0	N/A
365	0	0	0	0	N/A
366	0	0	0	0	N/A
367	0	0	0	0	N/A
368	0	0	0	0	N/A
369	0	0	0	0	N/A
370	0	0	0	0	N/A
371	0	0	0	0	N/A
372	0	0	0	0	N/A
373	0	0	0	0	N/A
374	0	0	0	0	N/A
375	0	0	0	0	N/A
376	0	0	0	0	N/A
377	0	0	0	0	N/A
378	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA-Not Applicable; no differences in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
379	0	0	0	0	N/A
380	0	1	0	1	Anti-Fy^a
381	0	0	0	0	N/A
382	0	0	0	0	N/A
383	0	0	0	0	N/A
384	0	0	0	0	N/A
385	0	0	0	0	N/A
386	0	(1)	0	0	Nonspecific;not detectable using Albumin
387	0	0	0	0	N/A
388	0	0	0	0	N/A
389	0	0	0	0	N/A
390	0	0	0	0	N/A
391	0	0	0	0	N/A
392	0	0	0	0	N/A
393	0	0	0	0	N/A
394	0	0	0	0	N/A
395	0	0	0	0	N/A
396	0	0	0	0	N/A

TABLE 28 (CONTINUED)

SCREENING TESTS USING ANTIBODY DETECTION CELLS SUSPENDED IN LISS WHICH WAS PREPARED USING PREWEIGHED PACKAGES*

* Sera were selected at random and sent to us for testing; concomitant testing using albumin indirect antiglobulin technique was performed by the referring institution. Discrepancies in results, if any, are discussed under the comments section. (NA=Not Applicable; no difference in test results using LISS or albumin methodology.)

Antibody Screening Results
using LISS suspended RBC

Patient Serum	Screening Cell I		Screening Cell II		Comments
	IS	AGT	IS	AGT	
397	0	0	0	0	N/A
398	0	0	0	0	N/A
399	0	0	0	0	N/A
400	0	0	0	0	N/A
401	0	0	0	0	N/A
402	0	0	0	0	N/A
403	0	0	0	0	N/A
404	0	0	0	0	N/A
405	0	0	0	0	N/A
406	0	0	0	0	N/A
407	0	0	0	0	N/A
408	0	0	0	0	N/A
409	0	0	0	0	N/A
410	0	0	0	0	N/A
411	0	0	0	0	N/A

TABLE 29

STABILITY OF LISS EMERGENCY PACKET*

AFTER DILUTION WITH WATER

Interval (Days)	Na^+ (mEq/L)	pH	Osmolality mOsm/KgH_2O	Conductivity (mS)	Molarity** (M/L)
1	35	6.5	301	4.0	0.035
5	34	6.5	306	4.2	0.037
12	34	6.6	311	3.9	0.034
18	39	6.6	299	3.6	0.032
25	37	6.5	293	3.9	0.034

* Contains 0.03% sodium azide as a preservative.

** Derrived from conductivity.

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